This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of claims:

1. (Currently Amended) A substrate processing apparatus, comprising:

a processing chamber;

a susceptor on which a substrate is to be placed; and

a heating unit disposed below said susceptor which heats said substrate placed on said susceptor, wherein

said susceptor and said heating unit are accommodated in said processing chamber,

said substrate is processed in a state in which said susceptor is rotated relative to said heating unit,

at least said susceptor is lifted and lowered in said processing chamber,

a lifting and lowering apparatus, ~~is~~ disposed in said processing chamber, which lifts and lowers said substrate with respect to at least a portion of said susceptor, and

wherein, when said substrate is lifted or lowered, at least with respect to said portion of said susceptor, a distance between said susceptor and said heating unit is maintained constant.

2. (Currently Amended) The substrate processing apparatus as recited in claim 1, wherein

said heating unit is lifted and lowered in said processing chamber, and

wherein said lifting and lowering apparatus lifts or lowers said substrate with respect to at least the portion of said susceptor in association with said lifting and lowering motion of said susceptor and said heating unit.

3. (Cancelled)

4. (Previously Presented) The substrate processing apparatus as recited in claim 1, wherein said lifting and lowering apparatus is disposed outside said susceptor.

5. (Previously Presented) The substrate processing apparatus as recited in claim 1, wherein said lifting and lowering apparatus is disposed inside said susceptor.

6. (Currently Amended) The substrate processing apparatus as recited in claim 1, wherein said susceptor comprises a central member and a peripheral member, and wherein said lifting and lowering apparatus lifts and lowers said central member of said susceptor.

7. (Currently Amended) The substrate processing apparatus as recited in claim 6, ~~wherein~~ further comprising:

a heater of said heating unit comprises a central heater member corresponding to said central member of said susceptor and a peripheral heater member corresponding to said peripheral member of said susceptor,

outputs of said central heater member and said peripheral heater member are independently controlled, and

wherein said output of said central heater member is increased while said central member of said susceptor is lifted or lowered.

8. (Currently Amended) A substrate processing apparatus, comprising:

a susceptor disposed in a processing chamber and on which a substrate is to be placed, and

a heating unit disposed below said susceptor in said processing chamber for heating said substrate placed on said susceptor,

wherein an upper surface of a peripheral portion of said susceptor and an upper surface of said substrate placed on said susceptor are flush with each other, and

wherein, when said substrate is lifted or lowered, at least with respect to a portion of said susceptor, a distance between said susceptor and said heating unit is maintained constant.

9. (Previously Presented) The substrate processing apparatus as recited in claim 8, wherein a member made of quartz which is flush with an upper surface of said susceptor is disposed in an outer periphery of said susceptor.

10. – 12. (Cancelled)

13. (Currently Amended) A substrate processing apparatus, comprising:

a processing chamber;

a susceptor on which a substrate is to be placed; and

a heating unit disposed below said susceptor which heats said substrate placed on said susceptor, wherein

said susceptor and said heating unit are accommodated in said processing chamber,

said substrate is processed in a state in which said susceptor is rotated relative to said heating unit,

at least said susceptor is lifted and lowered in said processing chamber,

a lifting and lowering apparatus, ~~is~~ disposed in said processing chamber, ~~which~~ that lifts and lowers said substrate with respect to at least a portion of said susceptor,

wherein said lifting and lowering apparatus is adapted to move ~~moves~~ up or down according to lifting or lowering motion of said susceptor to lift and lower ~~lifts and lowers~~ said substrate with respect to said portion of said susceptor,

wherein a lowering motion of said lifting and lowering apparatus is restricted when said lifting and lowering apparatus abuts ~~a~~ an abutting position provided at ~~an arbitrary~~ a position of said processing chamber, and

wherein said abutting position is provided on a downside of an upper face of said heating unit and is not located between said heating unit and said susceptor.

14. (Currently Amended) A substrate processing apparatus as recited in claim 13,

wherein said heating unit is lifted and lowered in said processing chamber, and

wherein said lifting and lowering apparatus lifts or lowers said substrate with respect to at least the portion of said susceptor in association with said lifting and lowering motion of said susceptor and said heating unit.

15. (Currently Amended) A substrate processing apparatus as recited in claim 13, wherein, when said substrate is lifted or lowered, at least with respect to said portion of said susceptor, a distance between said susceptor and said heating unit is maintained constant.

16. (Previously Presented) A substrate processing apparatus as recited in claim 13, wherein said lifting and lowering apparatus is disposed outside said susceptor.

17. (Previously Presented) A substrate processing apparatus as recited in claim 13, wherein said lifting and lowering apparatus is disposed inside said susceptor.

18. (Currently Amended) A substrate processing apparatus as recited in claim 13,

wherein said susceptor comprises a central member and a peripheral member, and

wherein said lifting and lowering apparatus lifts and lowers said central member of said susceptor.

19. (Currently Amended) A substrate processing apparatus as recited in claim 13, ~~wherein~~ further comprising:

a heater of said heating unit comprises a central heater member corresponding to said central member of said susceptor and a peripheral heater member corresponding to said peripheral member of said susceptor, and

wherein outputs of said central heater member and said peripheral heater member are independently controlled, and

wherein said output of said central heater member is increased while said central member of said susceptor is lifted or lowered.

20. (Currently Amended) A substrate processing apparatus, comprising:

a processing chamber;

a susceptor unit including a susceptor on which a substrate is to be placed;

a heating unit disposed below said susceptor which heats said substrate placed on said susceptor; and

a gas blowout plate which supplies gas from above said substrate to the substantially entire surface of said substrate, wherein

said susceptor and said heating unit are accommodated in said processing chamber,

said heating unit and said susceptor unit ~~rotates~~ rotate relative to each other,

said substrate is processed in a state in which said susceptor is rotated relative to said heating unit,

at least said susceptor is lifted and lowered in said processing chamber~~,~~; and

a lifting and lowering apparatus, ~~is~~ disposed in said processing chamber, which lifts and lowers said substrate with respect to at least a portion of said susceptor, and

wherein said lifting and lowering apparatus is disposed engaging ~~in~~ both said heating unit and said susceptor unit.

21. (Currently Amended) A substrate processing apparatus, comprising:

a processing chamber;

a susceptor unit including a susceptor on which a substrate is to be placed;

a heating unit disposed below said susceptor which heats said substrate placed on said susceptor, and

a gas blowout plate which supplies gas from above said substrate to the substantially entire surface of said substrate, wherein

said susceptor and said heating unit are accommodated in said processing chamber,

~~said heating unit and said susceptor unit rotates relative to each other,~~

said substrate is processed in a state in which said susceptor is rotated relative to said heating unit,

at least said susceptor is lifted and lowered in said processing chamber,

a lifting and lowering apparatus is disposed in said processing chamber which lifts and lowers said substrate with respect to at least a portion of said susceptor, and

said lifting and lowering apparatus is disposed engaging in both said heating unit and said susceptor unit.

22. (Currently Amended) A substrate processing apparatus, comprising:

a processing chamber;

a susceptor on which a substrate is to be placed; and

a heating unit disposed below said susceptor which heats said substrate placed on said susceptor, wherein

said susceptor and said heating unit are accommodated in said processing chamber,

said substrate is processed in a state in which said susceptor is rotated relative to said heating unit,

at least said susceptor is lifted and lowered in said processing chamber,

a lifting and lowering apparatus, ~~is~~ disposed in said processing chamber, which lifts and lowers said substrate with respect to at least a portion of said susceptor, and

a gas introducing position, a substrate processing position, a gas exhaust position and a substrate transferring in and out position is disposed in this order from above.

23. (Currently Amended) A substrate processing apparatus, comprising:

a susceptor disposed in a processing chamber and on which a substrate is to be placed, and

a heating unit disposed below said susceptor in said processing chamber which heats said substrate placed on said susceptor, wherein

an upper surface of a peripheral portion of said susceptor and an upper surface of said substrate placed on said susceptor are flush with each other~~,~~; and

a member made of quartz which is flush with an upper surface of said susceptor is disposed in an outer periphery of said susceptor~~. and~~

wherein said quartz ~~susceptor periphery~~ member suppresses heat of said substrate from escaping outside.

24. (Currently Amended) The substrate processing apparatus as recited in claim 18, further comprising:

a plurality of thermocouples for measuring a temperature of said substrate.

25. (New) The substrate processing apparatus as recited in Claim 20, wherein

said lifting and lowering apparatus comprises at least two members, and one of the two members engages in said susceptor and the other of the two members engages in said heating unit.

REMARKS/ARGUMENTS:

Claim 25 is added. Claims 1, 2, 4-9, and 13-25 are pending. Claims 1, 2, 6-8, 13-15, and 18-24 have been amended. These amendments do not narrow the scope of the claims. Reexamination and reconsideration of the application, as amended, are respectfully requested for at least the following reasons.

Claim Objections

Claim 21 was objected to under 37 C.F.R. § 1.75 as being a substantial duplicate of claim 20. Claim 21 has been amended to remove certain limitations. The amended claim 21 is no longer a substantial duplicate of claim 20. This amendment does not narrow the scope of claim 21 but broadens it.

Rejections Under 35 U.S.C. §112

Claim 13

Claim 13 was rejected under 35 U.S.C. §112, first paragraph since this claim allegedly includes subject matter not described in the specification. Specifically, the Examiner stated that the reference to arbitrary abutting position is not disclosed. The applicant had amended claim 13 to remove the reference to "arbitrary". This amendment does not narrow the scope of claim 13. The abutting position is disclosed throughout the detailed description and drawings, for example, at page 16, lines 13-25, page 17, lines 8-12, page 19, lines 10-14, page 23, line 14 and page 27, line 23.

Claims 1-2, 4-9, 14, 15, 19

Claims 1-2, 4-9, 14, 15, and 19 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner states that "These claims cite process limitations along with apparatus limitation. Reference to a process of moving susceptor and heater so that they maintain a distance, which is constant, applies to claims 1-2, 4-9 and 15. Claim 14 refers to the process of lifting and lowering the substrate while claim 19 refers to the process of heating while being lifted or lowered."

Applicants respectfully disagree and submit that claims 1-2, 4-9, 14, 15, and 19 are definite.

With regard to claim 1, Applicants submit that the limitation requiring that "when said substrate is lifted or lowered, at least with respect to said portion of said susceptor, a distance between said susceptor and said heating unit is maintained constant," is definite. This limitation describes an interrelationship between the susceptor and the heating unit that is included in the claimed substrate processing apparatus. Contrary to the Examiner's assertion, this limitation does not include a method step, but instead recites a structural limitation that relates to "a distance between said susceptor and said heating unit" when the substrate is lifted or lowered. Accordingly, claims 1-2, 4-9 and 15 are definite and the rejection thereof under 35 U.S.C. §112, second paragraph should be withdrawn. In the event the Examiner seeks to maintain this ground of rejection, Applicants request a telephone interview with the Examine and his supervisor to discuss the definiteness of this limitation.

With respect to claim 14, Applicants also submit that claim 14 is definite and specifies the relative positions of the "substrate with respect to ... said susceptor" when "lifting and lowering" takes place. That is, the "lifting and lowering apparatus" performs a function in that it "lifts or lowers said substrate with respect to at least the portion of said susceptor in association with said lifting and lowering

motion of said susceptor and said heating unit." Thus, claim 14 merely specifies structural limitations of the "lifting and lowering apparatus" and does not recite process limitations. Accordingly, the rejection of claim 14 under 35 U.S.C. §112, second paragraph is inappropriate and should be withdrawn.

With regard to claim 19, claim 19 specifies characteristics of the "outputs of said central heater member." Specifically, claim 19 specifies that the "output of said central heater member is increased while said central member of said susceptor is lifted or lowered." Applicants submit that there is nothing in claim 19 that can be construed as a "process limitation," as asserted by the Examiner. Accordingly, Applicants submit that the rejection of claim 19 under 35 U.S.C. §112, second paragraph is improper and should be withdrawn.

Rejections Under 35 U.S.C. §101

Claims 1-2, 4-9, 14, 15, and 19 were rejected under 35 U.S.C. §101 since these claims allegedly "overlap two different statutory classes of invention."

As discussed above with respect to the rejections under 35 U.S.C. §112, second paragraph, claims 1-2, 4-9, 14, 15 and 19 recite structural limitations and characteristics of the claimed apparatus, and do not recite process limitations.

Accordingly, a rejection under 35 U.S.C. §101 is improper and should be withdrawn.

Art-Based Rejections

Rejections Under 35 U.S.C. §102 (b) and 35 U.S.C. §103 (a)

Claims 1-2, 4-8, 13-19 and 22 were rejected under 35 U.S.C. §102(b) as being anticipated by MacLeish, et al. [U.S. Patent No. 5,653,808]. Claim 24 was rejected under 35 U.S.C. §103(a) as being unpatentable over MacLeish, et al. These rejections are respectfully traversed.

Applicants note that the Official Action did not respond to the Applicants' remarks filed on March 10, 2003. Rather, at page 3 of the Office Action, the Examiner simply states:

> "Regarding claim 1, 8 and 15 the susceptor and the heating unit are **capable** of being lifted and lowered together so that the distance between the two **may** be kept constant (Col 5 line 34-37)." (Emphasis added.)

Applicants submit that this is a mischaracterization of the MacLeish reference since, as shown in FIGS. 1 and 2, MacLeish teaches a susceptor 50 that moves away from a housing 42 as the housing is raised upward. MacLeish explicitly describes at column 5, lines 36-39, that: "As housing 42 is raised toward the top of the chamber 34, i.e. toward dish 36, the second motor is activated and *elevates susceptor 50 away from housing 42*." (Emphasis added). Therefore, the distance in MacLeish may not be kept constant.

Applicants submit that independent claims 1 and 8 are patentable over MacLeish because MacLeish does not teach or suggest, for example, that "when said substrate is lifted or lowered . . . a distance between said susceptor and said heating unit is maintained constant," as required by claims 1 and 8. In the event the Examiner seeks to maintain a rejection based on MacLeish, Applicants respectfully request that the Examiner cite some portion of MacLeish that may reasonably be interpreted as teaching that "when said substrate is lifted or lowered . . . a distance between said susceptor and said heating unit is maintained constant," as required by claims 1 and 8.

Accordingly, for at least this reason, independent claims 1 and 8 are patentable over the cited references. Moreover, dependent claims 2, 4-7, and 9 are also patentable over the cited references at least by virtue of their dependency from independent claims 1 and 8.

With respect to independent Claim 13, the Examiner states, "Regarding claim 13, lift and lowering apparatus as being comprised of susceptor and housing it does get restricted in lowering at some point near the bottom of the chamber". The applicant respectfully disagrees. Claim 13 requires that "said lifting and lowering apparatus is adapted to move up or down according to lifting or lowering motion of said susceptor to lift and lower said substrate with respect to said portion of said susceptor". Neither the susceptor 50 nor the housing 42 of MacLeish et al. lifts and lowers the substrate (wafer 52) with respect to at least a portion of the susceptor 50. Therefore, the susceptor 50 and the housing 42 of MacLeish et al. does not teach or suggest the claimed lifting and lowering apparatus. In MacLeish et al. it is the pins 54 that lifts and lowers the substrate (wafer 52) with respect to at least a portion of the susceptor 50. However, the pins 54 abut the upper surface of the layer 46, which is between the susceptor 50 and the coils 44. (Please refer to Figs. 1 and 2, and column 5, lines 20-43.) The applicant therefore believes that Claim 13 is not anticipated or rendered obvious by MacLeish et al. Claims 14-19 and 24 depend from claim 13 and are therefore also patentable.

Regarding claim 22, the Examiner states, "Regarding claim 22 the parts disclosed are in the same order as claimed. Nevertheless rearrangement of parts has been held obvious." However, the slot 28d through which the process gases are introduced, the substrate processing position, and the slots 30b into which gases are flows for exhaustion are disposed in a substantially horizontal plane. (Please refer to Figs. 2, 4, 5, 6 and 7, and column 6, lines 26- 47 and column 8, lines 13 to 20.) To the contrary, Claim 22 requires that "a gas introducing position, a substrate processing position, a gas exhaust position and a substrate transferring in and out position is disposed in this order from above." The cited reference does not provide any suggestion or motivation to change the configuration taught therein to that claimed in claim 22. Accordingly, claim 22 is believed to be patentable over the cited reference.

Claims 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Nomura, Hisashi (JP 05291154). This rejection is respectfully traversed.

The Examiner states, "Nomura Hisashi discloses a processing chamber (Fig. 3), a susceptor (2), a heating unit disposed below the susceptor (3), the susceptor capable of lifting, lowering and being rotatable with respect to heating unit (Abstract)..." However, the abstract only reads "A wafer 4 is carried in from a wafer inlet and outlet 8 while the mounting part 13A of a rotary and lifting mechanism 13 is lifted to shift the wafer 4 to the mounting part 13A and then the wafer 4 is shifted to a susceptor 2 by lowering the mechanism 13. The wafer 4 is heated by a lamp 5 through a quartz window 6 on a chamber 1 surface with a shutter 7 in open state from the shifting step of the wafer 4 on the susceptor 2 to the starting of the film forming step simultaneously being heated also by a heater 3 through the susceptor 2..." and the abstract does not disclose nor suggest that the substrate is processed in a state in which the susceptor is rotated relative to the heating unit. Further, if the rotary and lifting mechanism 13 rotates the susceptor 2, then there must be a gap between the heater 3 and the rotary and lifting mechanism 13 and the susceptor 2. As a result, the rotary and lifting mechanism 13 does not engage in the heater 3. Claims 20 and 21, on the other hand, require that "said lifting and lowering apparatus is disposed engaging both said heating unit and said susceptor unit." This feature is not taught or suggested in the cited reference. Accordingly, claims 20 and 21 are believed to be patentable. New claim 25 depends from claim 20 and is therefore also patentable.

Claims 9 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over MacLeish, et al. in view of Okayama, et al. [U.S. Patent No. 6,334,983]. This rejection is respectfully traversed.

Claims 9 and 23 require "a member made of quartz which is flush with an upper surface of said susceptor is disposed in an outer periphery of said susceptor". The Examiner stated that "Okayama et al disclose a quartz ring disposed on the

susceptor at periphery and substantially flush with the upper surface of the susceptor (Fig 1-126 and Col 7 line 45-50) for focusing the plasma. Therefore it would have been obvious for one of ordinary skill to modify the susceptor of MacLeish et al with a quartz ring on the periphery so as to serve as a focus ring." However, the CVD Reactor of MacLeish et al. would not use plasma and the quartz ring is disposed on the periphery does not serve as a focus ring of the plasma. Therefore the cited references lack any teaching, suggestion or incentive supporting the combination of the two references. Accordingly, the applicant believes that claims 9 and 23 are patentable.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
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